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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/075,258  | 02/15/2002  | Lisa Scott           | 07130001AA          | 9103             |
| 7590  | 04/15/2004  |                      | EXAMINER            |                  |
| McGuireWoods LLP<br>Suite 1800<br>1750 Tysons Boulevard<br>McLean, VA 22102 |             |                      | BISSETT, MELANIE D  |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 1711                |                  |

DATE MAILED: 04/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/075,258             | SCOTT, LISA         |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Melanie D. Bissett     | 1711                |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 January 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4-14,16-23,25 and 26 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,4-13,23,25 and 26 is/are allowed.
- 6) ☒ Claim(s) 14 and 16-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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1. The rejections of independent claims 1, 9, 10, and 23 are withdrawn based on the applicant's amendment. However, the rejections of independent claim 14 are maintained for the reasons cited below.

***Claim Rejections - 35 USC § 103***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 14 and 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenfeld et al. in view of Chiu et al.
4. From a prior Office action:

Rosenfeld teaches preparing polyamic acids by reacting a mixture of dianhydrides with a diamine in the presence of NMP (col. 6 lines 13-39). To form a homogeneous solution, cosolvents including THF are included.

Rosenfeld teaches that dianhydrides including BPDA and ODA may be used in admixture to obtain polyamic acids (col. 6 lines 13-19). Examples show anhydride mixtures of 50% ODA with 50% of another anhydride monomer (Table III). However, the reference does not specifically note the mixture of BPDA and ODA. Because mixtures of dianhydrides are taught to improve solubility of the polyimide, and because a limited list of preferred dianhydride monomers is given, it is the examiner's position that it would have been prima facie obvious to form a polyamic acid solution from 50% ODA and 50% BPDA with the expectancy of forming a polyimide with equally improved solubility.

Also, Rosenfeld teaches using THF or toluene cosolvents with NMP but does not note the amount of THF to be used with toluene. Examples show mixtures of NMP with 10% toluene. Since the cosolvents are provided to improve the homogeneity of the polyamic acid mixture, it is the examiner's position that it would have been prima facie obvious to use about 10% THF with NMP to provide a cosolvent system having equally improved solubility.

Although the reference suggests that non-crosslinkable diamines including ODA may be incorporated into the polyimide structure in amounts up to 40%, the reference does not specifically exemplify the use of ODA in the polyamic acid systems. The polyamic acids of the invention have shown the formation of polyimides having improved appearance, where patterns formed have cleaner lines (col. 3 lines 12-26). Since the non-crosslinkable diamines are noted for use in the invention, it is the examiner's position that it would have been prima facie obvious to include ODA

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in the polyamic acids of the invention with the expectancy of forming a polyimide with improved appearance.

Regarding method claims, Rosenfeld teaches a method of forming polyimides by coating a substrate with a polyamic acid, heating the substrate to a temperature to evaporate the solvent, partially curing the polyamic acid, and heating the polyamic acid to form the polyimide (col. 11 lines 39-57).

Rosenfeld applies as above, failing to mention the use of added fillers. Also, Rosenfeld teaches applying the polyamic acid solutions to metal substrates and in electronic applications but fails to specifically mention coating metal foil substrates. Chiu teaches polyimides having good thermal stability made by dissolving a diamine and dianhydride in an aprotic solvent to form a polyamic acid solution. Laminates are formed using the polyimides resulting from the polyamic acid solutions and copper foil substrates (abstract). Polyamic acid solutions are coated onto a metal foil to be imidized by heat at temperatures above 250 °C (col. 2 lines 57-63). The laminates are used for flexible printed circuits (col. 1). Chiu employs similar anhydrides, diamines, and solvents as those in Rosenfeld's invention. Additionally, inorganic fillers including mica and/or silica are included in the polyimide in amounts of up to about 33% by weight to aid in processing and casting the solutions (col. 4 lines 26-52). The coatings are extruded through a slit die onto a copper foil substrate to form a material for use in flexible printed circuits (col. 4 lines 53-59). It is the examiner's position that it would have been prima facie obvious to use Chiu's method of coating a polyamic acid onto a copper foil substrate to employ the polyimides of Rosenfeld's invention in flexible printed circuit applications. It is also the examiner's position that it would have been prima facie obvious to include inorganic fillers in the polyamic acid solutions of Rosenfeld's invention to aid in the processing and casting of the coatings.

5. Regarding the applicant's limitation of the solvent mixture used to form the polyamic acid layer, it is noted that the polyimide laminate is written in product-by-process format. Since the solvents are used to dilute the polyamic acid to aid in casting the coating and are not used to react with the polyamic acid, it is the examiner's position that a polyimide formed from Rosenfeld's solution would be indistinguishable from that formed by the claimed process.

***Allowable Subject Matter***

6. Claims 1, 4-13, 23, and 25-26 are allowed.

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7. The following is a statement of reasons for the indication of allowable subject matter:

8. The closest prior art, Rosenfeld et al., teaches that cosolvents including THF may be employed in polyamic acid solutions with NMP. However, the reference exemplifies using cosolvents in amounts of about 10% by volume and does not specify the use of THF in the applicant's claimed amounts. Therefore, it is the examiner's position that the formation of polyamic acid precursors using the specified amounts of THF and NMP in the applicant's claimed methods and polyamic acid compositions would provide a novel and unobvious step over the prior art.

#### ***Response to Arguments***

9. In response to the applicant's arguments that the claims have been amended to overcome the prior art rejections, it is noted that claim 14 is drawn to a polyimide laminate formed by casting a solution of a polyamic acid and a specific solvent mixture. The solvent is evaporated, and the polyamic acid is cured to form the final polyimide product. It is the examiner's position that the polyimide articles formed by Rosenfeld's invention would be indistinguishable from those formed by the claimed process. Since the final product is claimed, which does not possess the solvent mixture, it is the examiner's position that the combined teachings suggest the claimed product.

***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

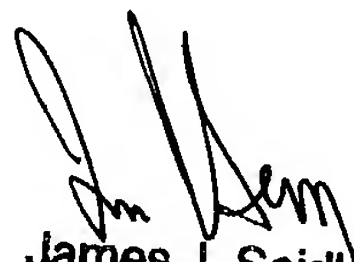
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie D. Bissett whose telephone number is (571) 272-1068. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mdb



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